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"FIVE YEAR FORECAST

"THE WORLD DEMAND-SUPPLY OF COMMERCIAL PETROLEUM TANKERS[1] - 7 Jan 53

"During the next five years the number of commercial petroleum tankers required to move crude and products between production and consumption centers of the world will be less than the number likely to be available by a rather substantial margin.

"This forecast of demand and supply indicates that the tight balance between demand and supply of tonnage which has existed from the latter part of 1950 until recently is shifting. Confirmation of this is evidenced by two facts:

1. The 'London Broker's Award'[2] for the period commencing October 1 dropped from approximately U.S.M.C. + 70% to U.S.M.C. + 35%.

2. The current spot charter market has failed to achieve its seasonal increase.

Two assumptions have been employed in this analysis of tanker demand:

1. That the Iranian oil dispute would be settled by July 1, 1953.

2. That the Abadan refinery would not reopen, but that its capacity would be replaced elsewhere in the Eastern Hemisphere during the years 1955 through 1957.[3]

"Under the first assumption the surplus of tankers increases from an average of 38 T-2 equivalents in 1952 to a peak of 207 T-2 equivalents in 1956 and declines to 152 T-2 equivalents in 1957.

Table 1

Yearly Averages ... and Demand for Commercial Petroleum Tankers

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	1953	1954		1956	1957
Demand	1,521	1,590	1,689	1,786	1,898
Supply	1,590	1,742	1,887	1,993	2,050
Surplus	+ 69	+ 152	+ 198	+ 207	+ 152

"Under the second assumption the length of time to achieve Eastern Hemisphere self-sufficiency is somewhat longer and the surplus of tankers from 1953 to 1956 is somewhat higher than in Case #1.

Table 2

Yearly Average Supply and Demand for Commercial Petroleum Tankers

	1953	1954	1955	1956	1957
Demand	1,518	1,563	1,662	1,775	1,898
Supply	1,590	1,742	1,887	1,993	2,050
Surplus	+ 72	+ 179	+ 225	+ 218	+ 152

"Demand for Commercial Tankers

"A forecast of tanker requirements must take into account:

1. The geographic location and outlook for differential growth of crude production, refining centers, and demand in consuming areas.[4]

2. Costs of producing crude oil in specific areas, and transporting it (or its products) to various markets.

3. The conflict between industry economics and company economics.[5]

"The projection of demand for tankers has been tied into two basic movement patterns for the international petroleum trade. The first was for the year 1950 which, despite the incidence of the Korean affair, might be considered the more normal year. The second was an estimate of 1952 movements, a year which included not only the effects of Korea in intensified form, but some of the radical shifts resulting from the closing of the Abadan refinery in 1951. The 1950 figures were prepared by PAD and the 1952 estimates were prepared by the Foreign Petroleum Supply Committee. Close analysis of these movement patterns indicates the probability that both are defective in certain respects. Movements between the principal shipping and receiving areas of the world were studied separately and in major groupings to determine what effect the forecast growth in crude production, refining capacity, and demand for products in each was likely to have on future demand for tankers as expressed in the double base employed.

"In addition to considerations already mentioned the following were taken into account:

1. The number of ships released by the construction and operation of large pipelines between the Middle East producing fields and the Mediterranean was taken into account. The Kirkuk-Banias line went into operation in April 1952. It is not anticipated that the existing Middle East lines will reach capacity throughput until 1952. It has been assumed that

the line to Haifa will remain shut down throughout the period. While demand in the receiving areas tributary to the Mediterranean pipeline terminals is expected to increase sufficiently to support additional pipeline capacity, no allowance has been made for new construction because the unsettled political and economic conditions in the Middle East appear to preclude any group risking the very substantial capital investment which would be required.

2. The number of ships released by the construction of the Inter-Provincial Pipe Line and the Trans-Mountain Pipe Line in Canada has been considered. Inter-Provincial has and will release a few tankers because it reduces the area in Eastern Canada which is dependent on products refined from imported crude. The Trans-Mountain line is expected to be even more effective in this respect. It not only will eliminate the import of crude and products into British Columbia but is expected to provide the raw material for a Washington-Oregon refining industry which will reduce the water movement of products along the Pacific Coast from the California refineries.

3. No allowance has been made for the release of tanker tonnage in the U. S. East Coast service if the U. S. Pipe Line project becomes a reality. This could amount to as much as 40 T-2's. If this project is abandoned a much smaller number of tankers will probably be displaced by the large diameter crude carriers which are gradually forcing the transportation break-even line eastward. Failure to make some allowances for possible developments in this area may result in a slight overstatement of demand for ships, but in view of the surpluses already shown the ommission is not considered significant.

4. For cost and currency reasons it has been assumed that the Eastern Hemisphere would become self-sufficient as soon as adequate refining capacity became available in that Hemisphere. It was also assumed that the flow of Middle East crude to the Western Hemisphere would be reduced to negligible quantities about the time the Eastern Hemisphere became self-sufficient.

5. Consideration has been given to the fact that the PAD and Foreign Supply Committee movement figures in our two base years (1950 and 1952) appear to be inflated which would tend to overstate the projected demand for tankers. It is believed that this deficiency is almost wholly offset by the fact that foreign ship operators have longer turn-around times and less effective days of operation per year than the factors used in our calculations since they are based on the experience of American Operators. Another consideration in this connection is the increasing proportion of foreign flag tramp tonnage to total world tonnage.

"Supply of Tankers

"The supply of commercial petroleum tankers, in T-2 equivalents is presented in the following table.

Table 3

Estimate of Commercial World Fleet Scrappage and Availability

Inventory & Additions	1953	1954	1955	1956	1957
In Service January 1	1,518	1,662	1,823	1,951	2,034
Additions to Fleet	200	211	194	146	76
Total Before Retirements	1,718	1,873	2,017	2,097	2,110
Retirements					
Reduction Backlog of Ships Over 20 Years Old*	56	50	66	63	45
In Service December 31	1,662	1,823	1,951	2,034	2,065
Average Available for Use	1,590	1,742	1,887	1,993	2,050

*As of 1/1/53 there were an estimated 95 T-2 equivalents 25 years of age and over. In effect maximum age is reduced below 25 years late in 1955 or early in 1956.

"Discussion of the factors considered in determining the supply of commercial tankers follows:

"Opening Inventory

"The inventory of commercial petroleum tankers on January 1, 1953 was determined as follows:

Commercial fleet (6,000 DWT and Over) from PAD 1/1/51	1,260
Plus:	
Estimated construction 1/1/51 - 12/31/52	268
Less:	
Estimated scrapping and loss	10
In service January 1, 1953	1,518[7]

"Additions to the Fleet

"In order to place conclusions concerning the probable additions to the tanker fleet in proper perspective, the trend in orders on the books of shipyards of the world as well as the tonnage actively under construction is tabulated below.

Table 4

Gross Tonnage of Tankers Building and on Order
Compared to Shipyard Building Activity
(Thousands of Tons)

	Tankers[1] Building and On Order	Tankers[2] Actively Under Construction	Dry Cargo[2] Actively Under Construction	Total[2] Actively Under Construction
Jan. - 1951	4,017	1,928	2,891	4,819
Apr. - 1951	5,693	1,981	3,116	5,097
July - 1951	6,273	2,046	3,285	5,331
Oct. - 1951	7,079	2,244	3,221	5,465
Jan. - 1952	8,094	2,335	3,159	5,494
Apr. - 1952	9,203	2,494	3,187	5,681
July - 1952	9,465	2,576	3,038	5,614
Oct. - 1952	9,740	2,927	2,938	5,865
Jan. - 1953 e	10,000	3,100	2,800	5,900

e - Estimated
1 - Shipbuilders Council of America
2 - Lloyd's Register of Shipbuilding Returns

"In the last 2 years the tonnage of tankers on order has increased by 2 1/2 times. The tonnage actually being worked on in shipyards has increased by about 60%. By comparison dry cargo tonnage under construction has shown about a 3% drop from January 1951 and a 15% decline from the peak reached in July 1951. The estimated tonnage of tankers building or on order as of January 1, 1953 is equal to roughly 960 T-2 equivalents or more than 63% of the world's commercial petroleum fleet on the same date. The estimated tonnage actively under construction January 1, 1953 is equal to about 300 T-2 equivalents. Depending upon availability of materials tankers can be completed in from 15 to 18 months from the time construction starts.

"Analysis of available information indicates that delivery dates promised by shipyards in busy periods, such as at present, are overly optimistic. Set forth in the following tabulation is a comparison between promised dates and the assumptions used in this analysis. If the promised delivery dates were to be met 121 additional T-2 equivalents would be delivered between July 1, 1952 and December 31, 1954. This would serve to increase additions to the tankers fleet in Table 3 and result in a greater surplus.

Table 5

Comparison of Shipyard Building Schedules with Assumed Schedules July 1, 1952

	Promised Deliveries	Assumed Schedules
2nd Half - 1952	116.0	71.4
1953	272.3	200.0
1954	215.7	211.0
1955	140.2	194.4
1956	108.7	146.1
1957	45.5	75.6
1958	0.4	0.4
Total	898.8	898.9

"Retirements and Obsolescence

"There appears to be no unanimity of opinion concerning [illegible] obsolescence and

scrapping of tankers. There is general agreement, however, on the fact that retirements of vessels are almost negligible so long as high charter rates are obtainable and that the rate of scrapping increases markedly in periods of low charter rates.

"At the beginning of 1953 there were 95 T-2 equivalents over 25 years of age while 100 additional vessels become 25 years of age during the next 5 years. If the number of ships on the order books of the yards are actually built the probabilities are that charter rates would decline to levels which would force the scrapping of an additional 85 T-2 equivalents ranging between 20 and 25 years of age. Retirements in any given year, therefore, will depend upon deliveries of new vessels and the demand for ships as expressed in the general level of charter rates.

"The substantial tanker surplus indicated for the years 1954 to 1957 presents two problems which must be considered: 1. What was the basis on which owners placed so many orders with shipyards? 2. What steps may be taken to bring the supply and demand ratio for commercial tankers into better balance?

"The answer to the first can be rationalized in this manner. The long term trend in petroleum consumption outside the United States, excluding the war years and the three worst depression years, indicates an annual growth in demand averaging about 11% per annum. Some foreign operators using this observation as a 'rule of thumb' plan for an 11% increase in capacity in order to take care of the maximum demands that may be placed upon them. Naturally, if experience fails to match expectations, the intention is to cut back future building programs to the extent of any over estimate. It is interesting to note that if demand outside of the United States were to increase by 11% per year between 1952 and 1956 tanker supply and demand would be in exact balance and the indicated surplus of 207 T-2 equivalents would be required to meet demand. Our forecast of demand outside of the United States contemplates an average annual rate of increase of 6.6% (see page 23 of Forecast of December 2, 1952).

"In answer to the second question, the owners of tankers have it within their power to reduce the indicated surpluses by cancellation of tankers orders. Indeed, there may even be some easing up in the pressure on the yards to make capacity deliveries in 1953 and 1954 which would mean lengthening out the construction cycle to something more than the 17 plus months employed in estimating the probable capacity of shipyards to make deliveries. However, it is difficult to envision more than a 10% cutback in 1953-1954 deliveries since almost three-quarters of these ships are already actively in construction. Furthermore, at least as far as British yards are concerned while 1,150,000 gross tons were under construction on September 30, 1952, the yards had approved plans and were already ordering in material for the construction of an additional 1,650,000 gross tons. Therefore, assuming no step-up in military operations it would appear that the surpluses in 1953 and 1954 are likely to be substantially as shown after which cancellations may operate to reduce the surpluses calculated on the basis of known orders.

"U. S. Flag Tonnage

"Foreign flag ships are not permitted to carry cargo between the U. S. ports. For this reason it was necessary to take a quick look at the supply and demand for U. S. flag tonnage. The following tabulation shows the employment of U. S. flag tankers of 1,000 gross tons and over expressed as T-2 equivalents.

Table 6

Employment of U. S. Flag Privately Owned Seagoing Tanker Fleet
1,000 Gross Tons and Over as of September 30, 1952

	T-2 Equivalents*
Nearby Foreign Service	64.1
Overseas Foreign Service	35.1
Foreign to Foreign	52.2
Coastwise	198.3
Intercoastal	8.0
Non-contiguous Possessions	11.6
Temporarily Inactive	32.9
Total	402.2

*Uncorrected for speed. This reduces the total number by approximately 2½%. Maritime Administration figures give no clue to which services employ the slower vessels.

"Only 198 T-2's were employed in coastwise service, 8 in intercoastal service and 12 between the U. S., Alaska and Hawaii. Of the balance, equivalent to 184 T-2's, some were employed in non-mandatory U. S. flag runs and others were temporarily inactive. This balance, after allowing for probable obsolescence, is more than sufficient to transport any increase in demand expected in the next five years even if no new American flag ships were to be built. If American labor costs are taken into consideration and if the world surplus of tankers is as large as the estimates indicate, it seems probable that American flag ships will have difficulty competing with foreign flag ships in many parts of the world where they are now operating. Under these conditions it would be logical to expect the world surplus to react with unfavorable differential effects on the employment of American flag tankers.

"Differential Growth in Non-Oil Company Ownership of Tankers

"The distribution between oil company and non-oil company ownership of tanker tonnage has swung from a preponderance of oil company ownership pre-war to a preponderance of non-oil company ownership in the post-war years. Furthermore, the trend is still in favor of non-oil company ownership. Of the total tonnage on order almost three-quarters was for account of tramp operators. It is, of course, true that a substantial part of this tramp tonnage is under charter to the oil company group for varying lengths of time, but the differential growth in the number of owners of tankers as against the number of users of tankers suggests sharply stepped up competition in the matter of charter rates in a period of world surplus tonnage.

"War-Built T-2's

"The thesis has been advanced in certain quarters that some of the orders on the books of the shipyards have been placed early in anticipation of the inability of the builders to take care of replacements of war-built T-2's and provide for the normal growth in demand for tonnage at the same time. Almost 800 of these ships are still in service throughout the world including 650 built in the three years 1943 through 1945. The expected growth in the demand for petroleum products will necessitate the construction of about 122 T-2's per year between 1957 and 1962. If this new requirement for tonnage is taken into account it is possible to visualize a demand

on shipyards for 1,016 T-2's in a three year period or 339 T-2's a year. This is far in excess of the yearly requirement for any one of the next five years. The capacity of the world's shipyards to make deliveries at this annual rate would depend on the demand for dry cargo tonnage.

"It seems obvious to us that all the ships built in a single year will not be retired in a given year. Estimates of the useful life of war-built T-2's range between 15 and 20 years. Our calculations indicate a peak demand on shipyards of a maximum of 250 T-2's per year, and there is some reason for believing that this calculation may prove to be on the high side. On the basis of a 20 year life for war-built T-2's the shipyard peak would come between 1961 and 1964. Under this assumption deliveries in 1958 would approximate those shown for 1957, while 1959 and 1960 deliveries would approximate those scheduled for 1956.

"Concern has been expressed about the effective life of the war-built T-2's. The claim is made that these vessels were hastily constructed and poorly maintained during their war service. The strengthening program of the past year has been attributed to these causes. The tendency of certain types of welded ships to develop corrugations in the bottom plating has raised a question as to whether the war-built T-2's can be effectively rebottomed and whether dry dock space is available to do the job. For these reasons another calculation has been made on the basis of an 18 year life. On this basis the shipyard peak (250 deliveries) might be expected in the years 1959 through 1963. Deliveries for 1958 would approximate those scheduled for 1956 with the low point scheduled for 1957.

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"Footnotes:

1 - Tankers of 6,000 D.W.T. and over expressed as equivalent T-2 type tankers of 16,765 D.W.T. with speed of 14 1/2 knots unless otherwise stated.

2 - The 'London Broker's Award' is a two year time charter rate established every six months by a group of six leading tanker brokers in London. It is used by oil companies in settling product exchange transactions.

3 - The new Anglo-Iranian 100,000 B/D refinery, for which ground has just been broken at Aden, may be the first step in such a replacement program. With the closing of Abadan the Eastern Hemisphere, lacking refinery capacity, was forced to draw on the Western Hemisphere for crude and finished products. This decreased tanker requirements because of the substantially shorter distance between the Caribbean and U. S. refining areas to northwest European consuming centers than from the Persian Gulf.

4 - Estimates here presented consider the factors presented in 'Five Year Forecasts of Demand and Supply of Petroleum Products' 12-2-52 and 'Five Year Forecasts of Refining Capacities' 12-8-52.

5 - There are times when company movements of crude and/or products may appear uneconomic from the industry point of view. These movements may be small but nevertheless do create an additional demand for tankers and are justified by company economics. Without this type of movement demand for tankers would be less.

6 - Construction of an additional line would release upwards of 75 to 100 tankers, but even a fairly prompt commitment would have no effect on the demand for tanker tonnage earlier than 1956 or 1957.

7 - Excludes 217 tankers employed in other than petroleum transportation i.e. whalers, molasses, alcohol and chemical carriers, as well as the U.S. Navy, British Admiralty and a few ships of other foreign governments. Includes, however, commercial tankers on charter to Military Sea Transport Service."